

Counting streets and roads, paved parking areas, driveways, sidewalks, and roofs, the total impervious area is 25 ha (31% of the watershed). Sixteen hectares (65% of the total impervious area) constitute the "effective" impervious area, which means that it drains to other impervious areas or directly to the storm sewer system. The remainder drains onto pervious areas such as lawns. The residential area is 28% impervious, whereas the commercial area is 64% impervious. The detention pond, located in the northwest corner of the watershed, is fed by about 4.1 km (14,000 ft) of storm sewer piping which converges to form one large inlet to the pond. Stormwater from this sewer system and direct precipitation onto the pond surface are the only known sources of water for the pond. Neither combined sewers nor any known leaking sanitary sewers contribute to the stormwater flow.

### ***Storm Characteristics and Detention Pond Hydrology***

The precipitation regime of the Greenville, NC area is characterized by intense, short duration thunderstorms during the summer and general frontal, longer duration storms during the winter and early spring. The long-term average precipitation is 122 cm (48 in) per year deposited by approximately 60 precipitation events, if the minimum dry time between storms is taken to be 8 hr (Shelly 1986). So, on average the precipitation events are about 6 days apart. Also, it has been estimated that for any given week of the year there is about a 50% chance for Greenville to receive >1.3 cm (>.5 in) of precipitation, between 25% and 45% chance for more than 2.5 cm (1 in), and 10-25% chance for more than 5.1 cm (2 in) (Imhoff and Davis 1983). The largest storms tend to occur in summer, and the smallest during the fall.

Although parts of the data for January and November 1992 are missing, the precipitation patterns for the study year appear similar to the long-term averages. Estimated total precipitation for the year was 119 cm (47 in), and there were at least 50 precipitation events (Appendix C). The most notable departure from the norm occurred in the July-August period. July precipitation was only a little more than one-half the average, whereas August was an unusually wet month, with a total rainfall over 33 cm (13 in). Much of the excess rain fell during an extended storm between 12 August and 18 August.

The eight storms monitored during this study encompassed a wide variety of rainfall characteristics and antecedent conditions (Table 2). On several occasions, an initial precipitation event produced runoff that begun to fill the previously dry pond. The precipitation stopped, but began again one or more times before all the runoff from the earlier events had drained from the pond (see Appendix D). In these situations, all the precipitation that fell until the pond finally drained constituted a single "storm". Total storm rainfalls ranged from 1.2 cm (0.48 in) for storm 5 to 23.6 cm (9.28 in) during storm 8. Duration of rainfall (continuous or intermittent) ranged between 7.8 hr and 115 hr (storms 2 and 8, respectively). In some cases, most of the rain fell during short time periods with intervening periods of several hours